

# **Natural Sciences 102 -- Spring 2004**

Homework #1, March 30, 2004

Due in class April 6, 2004

1. In science there are things called models, theories, and laws.
  - a) What is your understanding of what are models, theories, and laws? What are the differences between them? (Remember your answer because you will be asked the same question toward the end of the course.)
  - b) Apply your definitions to things in science you might know about or have heard about, such as evolution, the Ptolemaic picture of the solar system, continental drift, quantum mechanics, relativity. Why do you think some things are called theories and others called laws or models? Is there a value judgment here? Are laws better than models, etc?
  - c) Even more challenging, how might your definitions in a) be useful outside of science, say in politics, economics, sociology, or dating?
  - d) Do you think there is a progression in science, say model  $\rightarrow$  theory  $\rightarrow$  law?

There are no right or wrong answers to these questions. I don't want a dictionary answer, but your present understanding. Roll your own! You will be graded based upon the thoughtfulness of your answer.
2. I stated in class that every culture has had a cosmology. Tell me about a cosmology, a view of the universe. Please, something other than Genesis. Something non-Western. Tell me how it reflects the culture of the people involved. A reference or two should be included.
3. This problem requires "fuzzy math."
  - a) How many stars do you think you can see in the sky with the unaided eye?
  - b) How many atoms are in the sun?
  - c) How many seconds in a human lifetime?

This exercise is practice for the kind of "order of magnitude" estimates we will make throughout the course.

## News of the week

- Reading assignment for April: Kolb, Chapters 1-5
- Something to think about before class on Thursday, April 1: How do you know Earth moves?
- The class website is up. Mouse around <http://home.fnal.gov/~rocky/natsci102> for exciting information, including all diagrams and pictures projected in class.
- Laboratory/Discussion sections begin next week.